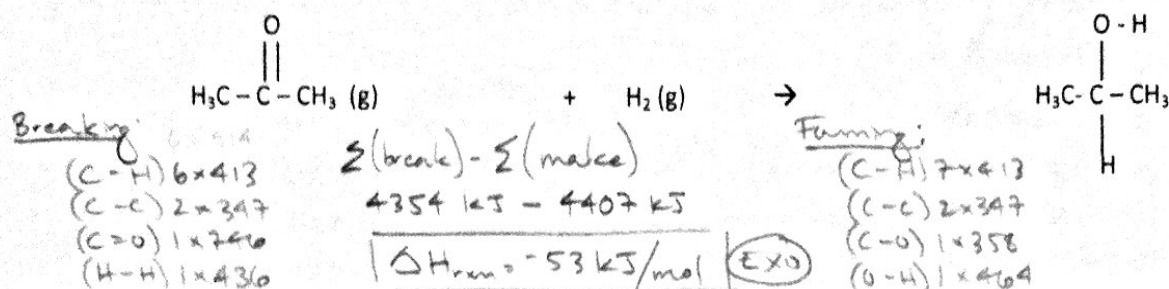


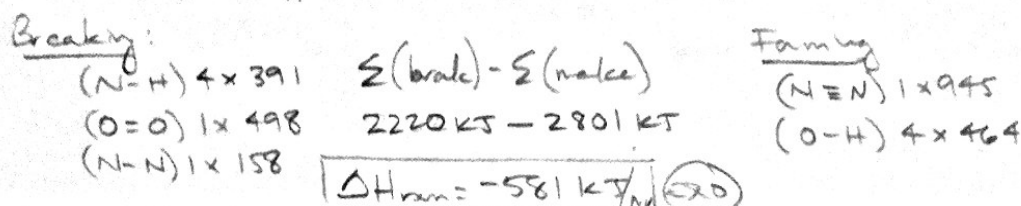
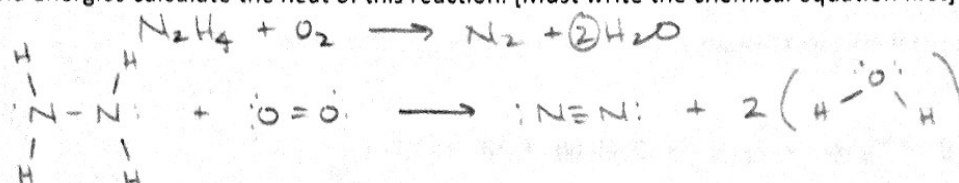
## T05D06 - Bond Energy (James, is that you?)

Name ..... KEY .....

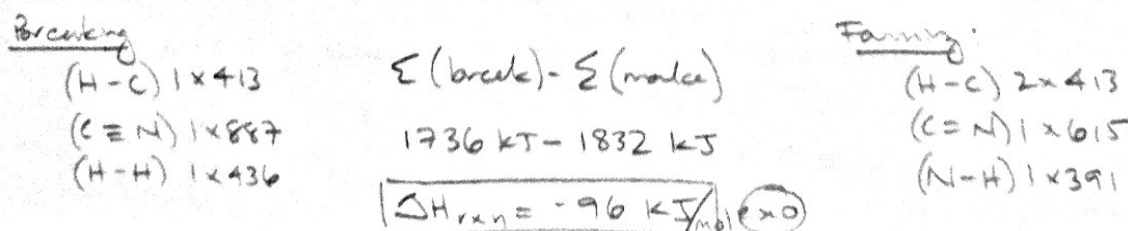
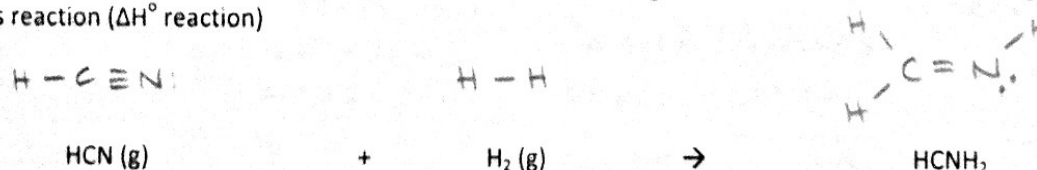
1. Acetone can be converted into isopropyl alcohol, rubbing alcohol, by the following process.



2. Hydrazine,  $\text{N}_2\text{H}_4$ , is used as a rocket fuel because it reacts very vigorously with oxygen to form nitrogen gas, and water vapor. Using bond energies calculate the heat of this reaction. [Must write the chemical equation first]

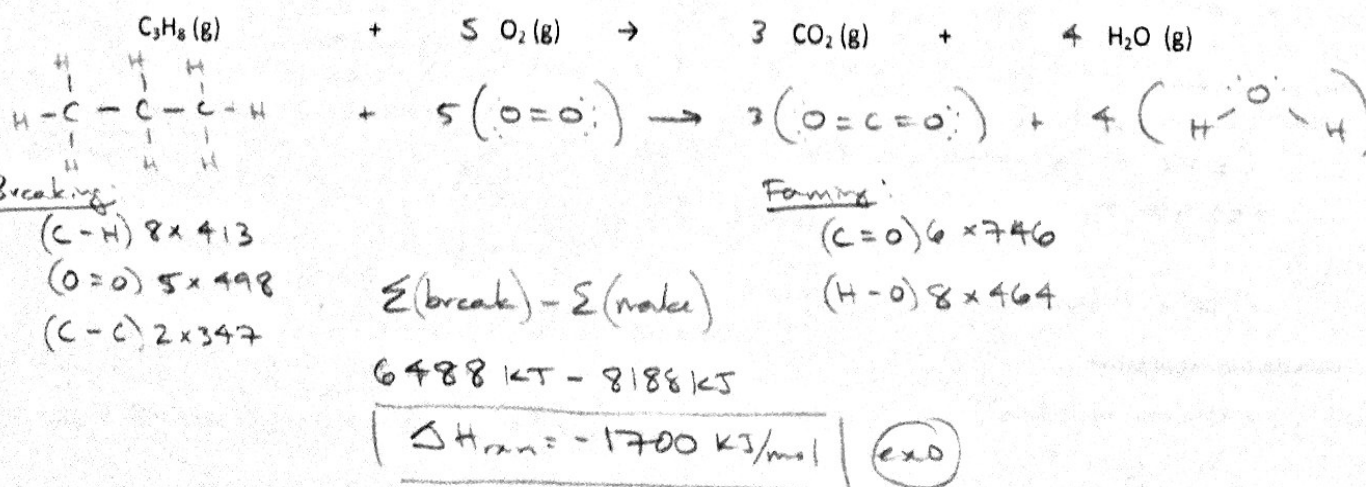


3. Hydrogen cyanide can be reduced with hydrogen to form amines. Using Lewis structures, and bond energies estimate the heat for this reaction ( $\Delta H^\circ$  reaction)

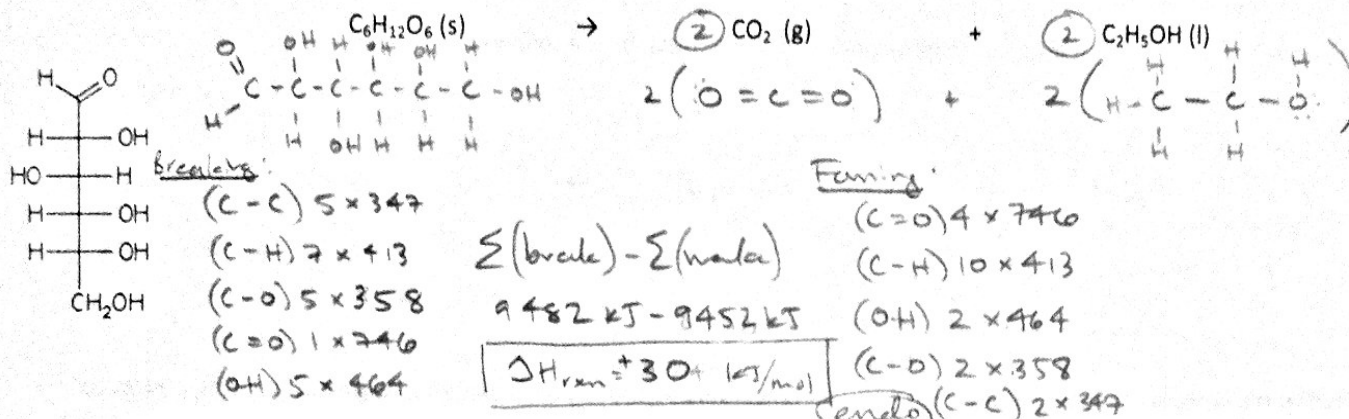


4. Use bond energies to estimate  $\Delta H$  for each of the following. Each are skeletons and must be balanced.

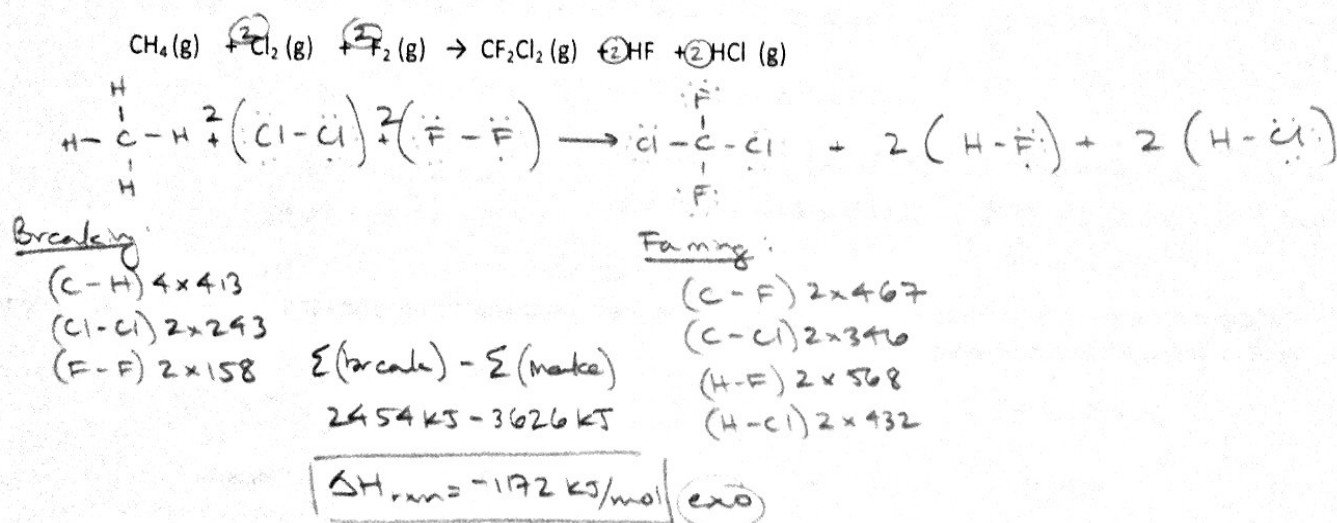
- a. The combustion of propane fuel:



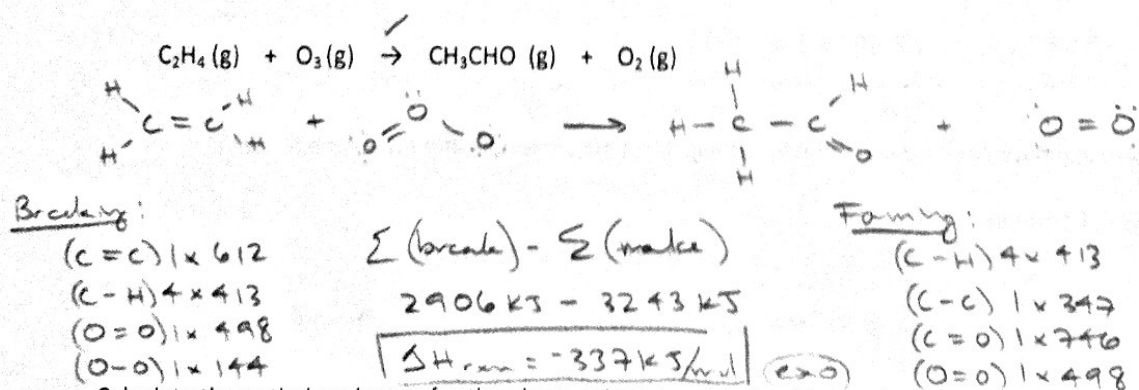
- b. Fermentation of glucose (sugar, an aldose monosaccharide) in the absence of oxygen. This process is known as anaerobic respiration: (use the straight chain monomer seen at left, rather than the ring structure of glucose)



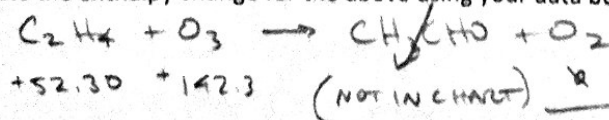
5. Calculate the enthalpy change,  $\Delta H$ , for the production of Freon-12 (one of my favorite global warming compounds) from the reaction of methane, chlorine, and fluorine. Skeleton equation given.



6. Using bond energies calculate the following enthalpy change,  $\Delta H$ . Skeleton equation. (BTW,  $\text{O}_3$  is ozone)



Calculate the enthalpy change for the above using your data booklet or the shared packet handed out in class.



$$\Delta H^\circ = H(\text{products}) - H(\text{reactants}) = \boxed{\phantom{0000}} - 194.6 \text{ kJ}$$

How do they compare?

\* In reality, ethene added to ozone forms two carboxyl products.

